

THE CLAIMS

1. A heat exchange tube assembly for heat exchangers and evaporators for increasing the rate of indirect transfer of heat between first fluid passing through and in contact with the inside wall of said heat exchange tube assembly and a second fluid passing on the outside and in contact with the outside wall of said heat exchange tube assembly comprising:

a metal heat exchange tube means having inner and outer wall surfaces and an opened inlet end for receiving said first fluid, flowing said first fluid there through and an opened outlet end for discharging said first fluid, and

a baffle means inserted and centrally disposed within said heat exchange tube means, said baffle means having a diameter substantially equal to the internal diameter of said heat exchange tube means, said baffle means separating the straight circular channel of said heat exchange tube means into two semi - circularly sectioned spiral channels extending along the length of said heat exchange tube means, said spiral channels providing a rotating spiralling flow path for said first fluid passing there through, said rotating spiralling flow of said first fluid generating centrifugal acceleration within said rotating first fluid and with said baffle means being made of a material chemically compatible with said metal heat exchange tube means, operating temperature and said first fluid.

2. The heat exchange tube assembly of claim 1, with said metal heat exchange tube means having a smooth inner and outer wall surfaces.
3. The heat exchange tube assembly of claim 1, with said metal heat exchange tube means having a smooth inner wall surface and an extended outer wall surface.
4. The heat exchange tube assembly of claim 1, with said metal heat exchange tube means having the inner wall coated with porous sintered metal deposit and having a smooth outer wall surface.
5. The heat exchange tube assembly of claim 1, with said metal heat exchange tube means having the inner wall coated with porous sintered metal deposit and having an extended outer wall surface.
6. A rotating film shell and tube type heat exchanger for indirect transfer of heat between first fluid passing

through a plurality of heat exchange tube assemblies and a second fluid passing through the shell comprising:

a shell having first and second ends, shell headers at said first and second ends, an inlet for said second fluid and an outlet for said second fluid,

a plurality of metal heat exchange tube means positioned within said shell and having opened intake ends for receiving said first fluid, flowing said first fluid there through and having opened outlet ends for discharging said first fluid,

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a baffle means inserted and centrally disposed within said heat exchange tube means, said baffle means having a diameter substantially equal to the internal diameter of said heat exchange tube means, said baffle means separating the straight circular channel of said heat exchange tube means into two semi - circularly sectioned spiral channels extending along the length of said heat exchange tube means, said spiral channels providing a rotating spiralling flow path for said first fluid passing there through, said rotating spiralling flow of said first fluid generating centrifugal acceleration within said rotating first fluid and with said baffle means being made of a material chemically compatible with said metal heat exchange tube means, operating temperature and said first fluid,

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first fluid inlet means for receiving said first fluid, with said first fluid inlet means being in fluid communication with said inlet ends of said plurality of heat exchange tube means, and

first fluid outlet in fluid communication with said outlet ends of said plurality of heat exchange tube means for discharging said first fluid.

7. The rotating film shell and tube type heat exchanger of claim 6, with said heat exchange tube means having smooth inner and outer wall surfaces.
8. The rotating film shell and tube type heat exchanger of claim 7, with said first fluid inlet means being a spray nozzle distributing said first fluid in a full cone spray into said intake ends of said plurality of heat exchange tube means.
9. The rotating film shell and tube type heat exchanger of claim 6, with said heat exchange tube means having a smooth inner wall surface and an extended outer wall surface.

10. The rotating film shell and tube type heat exchanger of claim 9, with said first fluid inlet means being a spray nozzle distributing said first fluid in a full cone spray into said opened ends of said plurality of heat exchange tube means.
11. The rotating film shell and tube type heat exchanger of claim 6, with said heat exchange tube means having the inner wall coated with porous sintered metal deposit and having a smooth outer wall surface.
12. The rotating film shell and tube type heat exchanger of claim 11, with said first fluid inlet means being a spray nozzle distributing said first fluid in a full cone spray into said opened ends of said plurality of straight heat exchange tube means.
13. The rotating film shell and tube type heat exchanger of claim 6, with said heat exchange tube means having the inner wall coated with porous sintered metal deposit and having an extended outer wall surface.
14. The rotating film shell and tube type heat exchanger of claim 13, with said first fluid inlet means being a spray nozzle distributing said first fluid in a full cone spray into said opened ends of said plurality of straight heat exchange tube means.
15. The rotating film shell and tube type heat exchanger of claim 6, with said first fluid and said second fluid being liquids.
16. The rotating film shell and tube type heat exchanger of claim 6, with said first fluid being a liquid and said second fluid being a condensing vapour.
17. The rotating film shell and tube type heat exchanger of claim 6, with said first fluid being a two-phase fluid of a boiling liquid and vapour and said second fluid being a liquid.
18. The rotating film shell and tube type heat exchanger of claim 6, with said first fluid being a two-phase fluid of a boiling liquid and vapour and said second fluid being a condensing vapour.
19. The rotating film shell and tube type heat exchanger of claim 6, with said first fluid being a two-phase fluid of a boiling liquid and vapour and said second fluid being a gaseous fluid.